# NESC Thermal Performance Database

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## ABSTRACT

The NASA Engineering and Safety Center (NESC) has chartered an assessment to address a key TPS data management problem and enable discipline enhancing analyses. The motivation for this activity stems from the lack of a central database for thermal performance test results and analyses from previous and current flight projects requiring Thermal Protection System (TPS) development. Thermal performance testing and analysis costs are high and represent a significant Agency investment. The data, even for a single test, reside in multiple locations. In the current situation, analysts and stakeholders expend an inappropriately high level of effort to collect data and validate the dataset. Much of the data is manually entered into individual spreadsheets that must be merged together to provide inputs for an analysis, in part because there is no standard reporting across the Agency. Decision makers subsequently find it difficult to draw conclusions and make optimal use of the testing and analysis. Historical data are also difficult to find and properly validate. Therefore, significant data from previous missions are currently being lost as elements are misplaced and key test principal investigators (PIs) move on to other projects.

The Agency will benefit from the thermal performance database because it will protect critical investments while saving current and future projects significant costs through increased efficiency. The database will also add value by providing high-level functionality such as outlier detection and automated validation features. The thermal performance test facilities will benefit from better understanding of their facilities and more direct facility-to-facility comparison. Finally, future projects will benefit from the wealth of validated data by leveraging it for inexpensive qualification and acceptance programs.

The NESC will fund the development, deployment, and initial data population of NASA's available thermal performance test results and analysis. Once deployed, the database will be handed over to the Arc Jet Complex at Ames Research Center (ARC) and the Atmospheric Reentry and Structures Evaluation Facility (ARMSEF) at Johnson Space Center (JSC) for continuing operations and maintenance. A focused historical data collection task will digitize the results from NASA's past flight project, techology development and research projects.